TRABAJOS DE PREHISTORIA
76, N.º 2, julio-diciembre 2019, pp. 254-271, ISSN: 0082-5638
https://doi.org/10.3989/tp.2019.12236

Striking, colourful, smooth, rare: lithic resources and cultural choices in the architecture, sculpture and portable artefacts of the Palacio III *tholos* monument (Seville, Spain)*

Sorprendente, colorido, suave, raro: recursos líticos y preferencias culturales en la arquitectura, escultura y artefactos portables del monumento tipo tholos *de Palacio III (Sevilla, España)*

Leonardo García Sanjuán[a], José Andrés Afonso Marrero[b], Primitiva Bueno Ramírez[c], Rodrigo de Balbín Behrmann[c], José Antonio Lozano Rodríguez[b], Gabriel Martínez Fernández[b], David W. Wheatley[d] and Marta Cintas Peña[a]

ABSTRACT

The investigation of the Iberian megalithic phenomenon has only recently begun to benefit from the expansion of the technical and scientific potential of modern archaeology. There are still very few Iberian megaliths for which high resolution scientific research has been carried out, providing detailed data on their design, uses and biographies. This paper presents the results of the multi-disciplinary study of the Palacio III *tholos*, part of a larger megalithic complex located in Almadén de la Plata (Seville). This study is based on a wide-spectrum methodology that integrates geoarchaeology, techno-morphological and functional analysis of portable material culture and graphic analysis, all combined within a meticulously contextual perspective. The results provide a wealth of data on how, through a series of carefully constructed cultural choices, this monument represents a true place of encounter between the locally available geological resources and other resources that were only accessible through contact with neighbouring communities. Whether in its raw state, finely carved in the form of engraved and painted sculptures or transformed into artefacts of high technical and personal value, the materiality of the stone in the Palacio III *tholos* acquires multiple cultural dimensions that only a modern scientific approach is able to reconstruct.

RESUMEN

Solo recientemente la investigación del fenómeno megalítico ibérico ha comenzado a beneficiarse de la ampliación del potencial técnico y científico de la arqueología moderna. Todavía son muy pocos los megalitos ibéricos para los que se han realizado investigaciones científicas de alta resolución, capaces de aportar datos detallados sobre su diseño, usos y biografías. En este trabajo se presentan los resultados del estudio del tholos *del complejo megalítico de Palacio III (Almadén de la Plata, Sevilla), abordado mediante una metodología multidisciplinar que integra la geoarqueología, el estudio tecnomorfológico y funcional de la cultura material portable y el análisis gráfico, dentro de una meticulosa valoración contextual. Los resultados aportan datos muy novedosos respecto a cómo, a través de una serie de elecciones culturales cuidadosamente construidas, este monumento representa un verdadero lugar de encuentro entre los recursos geológicos localmente disponibles y los recursos accesibles mediante contacto con otras comunidades. Bien en su forma bruta, bien labrada en forma de esculturas grabadas y pintadas o transformada en artefactos de alto valor técnico y personal, la materialidad de la piedra adquiere en Palacio III múltiples dimensiones culturales que solo a través de la moderna investigación científica es posible reconstruir.*

* This study has been funded by the project of "Nature, Society and Monumentality: High Resolution Archaeological Investigations on the Megalithic Landscape of Antequera" (HAR2013-45149-P) (2014-2017), sponsored within the National R&D Plan of the Ministry of Economy and Competitiveness (Spanish Government).

[a] Dept. of Prehistory and Archaeology. University of Seville. C/ María de Padilla s/n. 41004 Sevilla. Spain.
E-mails: LGS lgarcia@us.es https://orcid.org/0000-0002-8404-9252; MCP marcinpen@us.es https://orcid.org/0000-0001-5222-8769
[b] Dept. of Prehistory and Archaeology. University of Granada. Campus Universitario de Cartuja s/n. 18071 Granada, Spain.
E-mails: JAAM jaamarre@ugr.es https://orcid.org/0000-0002-9303-6293 ; JALR jalozano@ugr.es https://orcid.org/0000-0003-4598-4472 ; GMF gabmar@ugr.es https://orcid.org/0000-0002-7501-8032
[c] Dept. of History and Philosophy. University of Alcalá. C/ Colegios 2. 28801 Alcalá de Henares. Madrid. Spain.
E-mails: PBR p.bueno@uah.es https://orcid.org/0000-0001-8958-8928; RBB rodrigo.balbin@uah.es https://orcid.org/0000-0002-5868-1107
[d] Dept. of Archaeology. University of Southampton. Highfield Road. Southampton SO17 1BF. United Kingdom.
E-mail: d.w.wheatley@soton.ac.uk https://orcid.org/0000-0002-7265-704X

Recibido 5-IV-2019; aceptado 18-VI-2019

Key words: Geoarchaeology; Lithic resources; Megalith; Megalithic art; Material culture; Copper Age; Iberia.

Palabras clave: *Geoarqueología; Recursos líticos; Megalito; Arte megalítico; Cultura material; Edad del Cobre; Península ibérica.*

1. INTRODUCTION

The Palacio III megalithic funerary complex is located 65 km north of Seville, in a sector of the Almadén de la Plata municipality known as Dehesa de Palacio (Fig. 1). This site was discovered in the mid-1990s by Miguel Ángel Vargas Durán and was later excavated jointly by the Universities of Seville and Southampton in two seasons that took place between 7 August and 7 September 2001 and 2 and 27 April 2002.

This complex consists of three different structures: a dolmen (Structure 1), which was found in a poor state of preservation; a well preserved *tholos* (Structure 2); and a monumentalised cremation area dated to the Iron Age (Structure 3). In the intervening years, a number of papers have dealt with various aspects of the on-going study, including summaries of the surveys conducted in the area (García Sanjuán and Wheatley 2003; García Sanjuán and Vargas Durán 2004; García Sanjuán *et al.* 2004), analysis of visibility and mobility patterns within the context of the megalithic landscapes in the region (García Sanjuán *et al*. 2006a; Murrieta Flores *et al*. 2011, 2014), preliminary excavation reports (García Sanjuán and Hurtado Pérez 2001: 39-41; García Sanjuán 2005; García Sanjuán and Wheatley 2006), and studies of the finds, including quartz and rock crystal objects (Forteza González *et al.* 2008), ceramics (Odriozola Lloret *et al.* 2009) and human remains (Díaz-Zorita Bonilla *et al.* 2009) from Structure 2 (*tholos*), as well as the Orientalising Iron Age hoard found in Structure 1 (dolmen) (Murillo-Barroso *et al.* 2015; García Sanjuán *et al.* 2020). A monograph is currently being drawn up which will provide extensive information about the results obtained from this site.

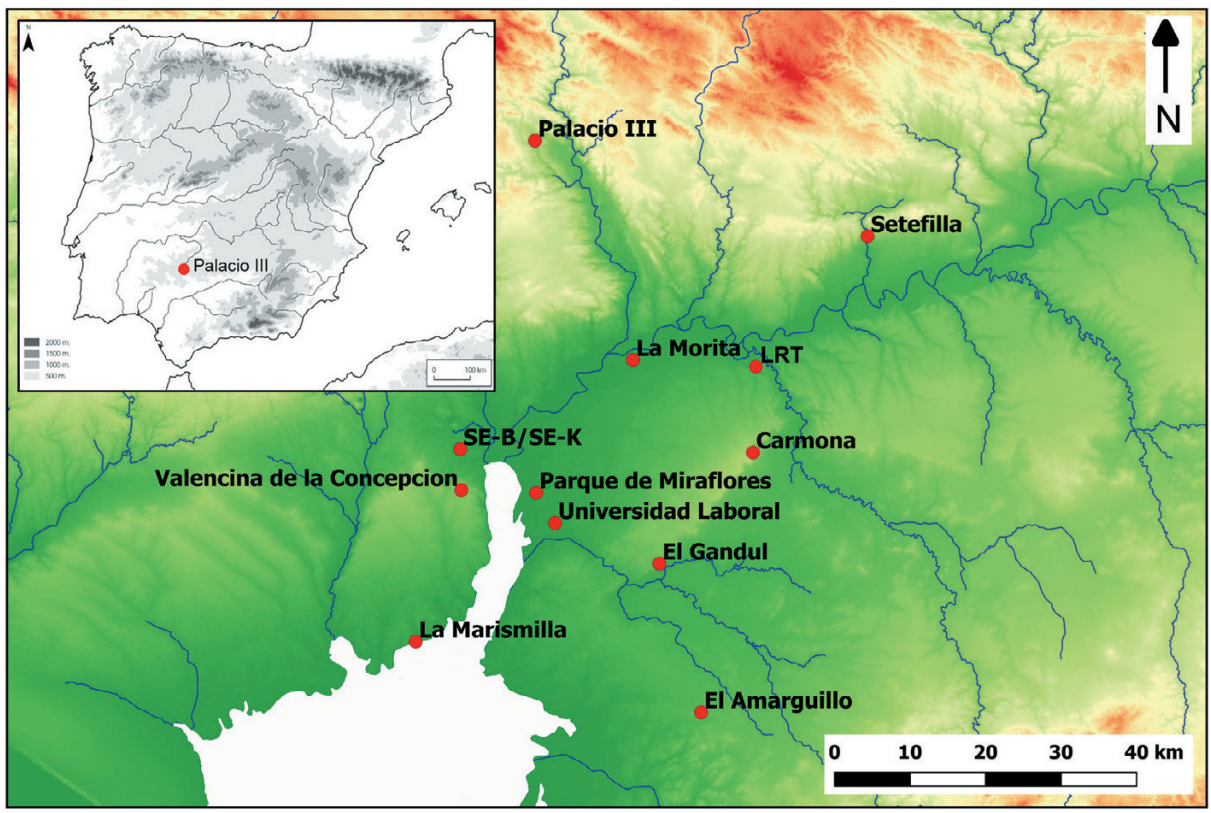

Fig. 1. Location map of the Palacio III megalithic complex showing the coastline at the time of the 3rd millennium cal BC. Above: within the Iberian Peninsula; below: within the Lower Guadalquivir river valley. Design Manuel Eleazar Costa Caramé and Leonardo García Sanjuán (in colour in the electronic version).

This paper deals with the analysis of the lithic resources used in the architecture, sculptures and portable material culture of Structure 2 at Palacio III. This structure appears to be a 'classic' corbelled-chamber monument (*tholos*) with a short corridor of 2 m in length and a maximum width of 0.6 m that leads to a circular chamber, partly cut into the bedrock (making it a 'semi-hypogeum') of between 2.3 m and 2.6 m in diameter. This structure was in quite a good state of preservation; the architectural elements were well preserved, including both orthostats and lintels in the corridor and the slabs lining the sides of the chamber; similarly, the engraved and painted elements on the slabs of the chamber and the three stelae identified were in a fairly good state of preservation, so much so that some of their painted motifs were identifiable to the naked eye during the excavation process. Regarding the grave goods, an estimated 184 artefacts were found, but it is difficult to establish a precise figure because of the high fragmentation involved in some cases. In addition, a large amount of stones was found inside the chamber. Our research establishes that these stones were also introduced in the chamber as offerings. The worst preserved element in the *tholos* is, without doubt, the organic record: no animal bone was found and the human remains identified were almost completely ground to dust. This has drastically undermined the possibility of a bioarchaeological study and has made it impossible to radiocarbon-date the monument.

The analysis of the lithology of the architectural elements and the portable artefacts in Structure 2 provides evidence of the greatest interest concerning how local prehistoric communities used the resources available to them. The Dehesa del Viar area, where the Palacio III burial complex is located, is a geologically-rich area, providing a great diversity of construction materials (CF1 and Fig. 2). At the same time, our study provides unambiguous evidence that the builders and users of this tomb had access to non-local raw materials. In this paper we discuss the nature and diversity of these lithological resources, and how they were used, over time, to create a complex palimpsest of material culture that blended together architecture, sculpture, graphic art and portable artefacts. Never

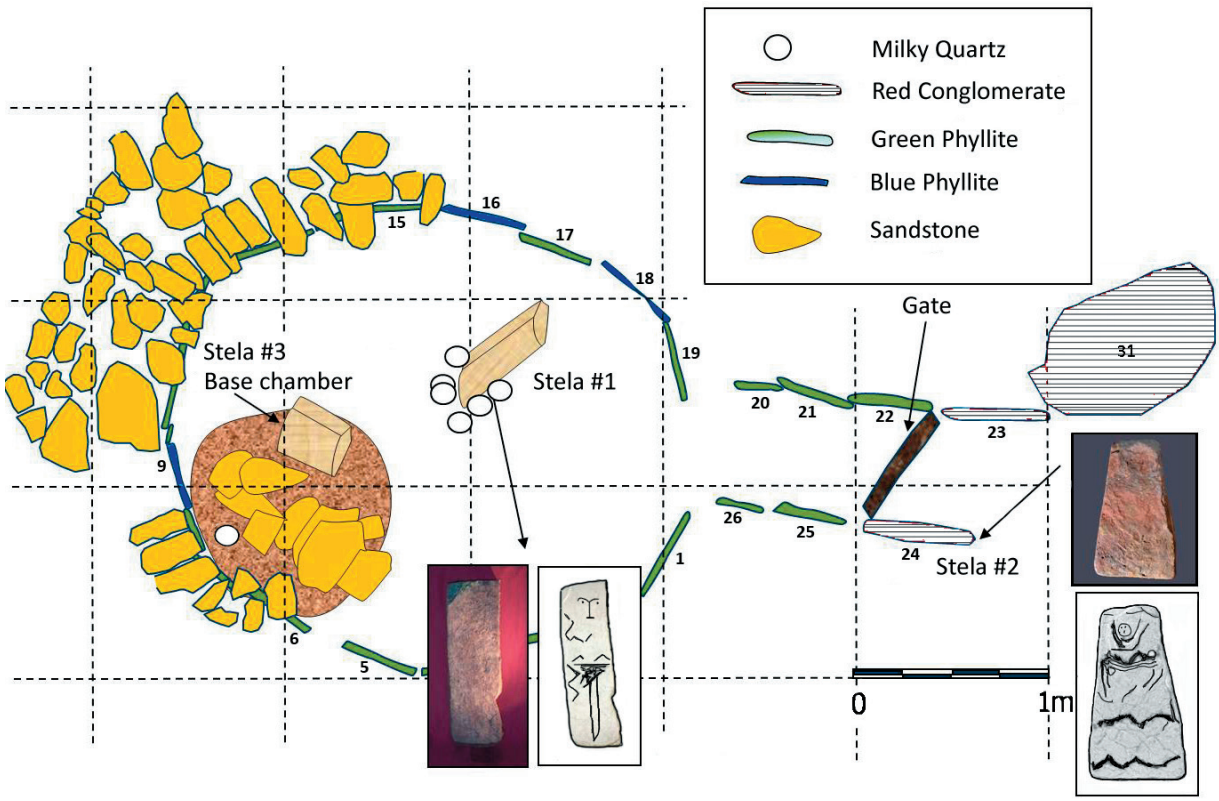

Fig. 2. Lithological diversity of constructive materials in the Palacio III *tholos*. The drawings and photos of stelae 1 and 2 are not shown to scale. Design Leonardo García Sanjuán and David W. Wheatley; the drawings of stelae 1 and 2 are from Bueno Ramírez *et al.* 2007 (in colour in the electronic version).

before the stone materiality of an Iberian megalithic monument has been studied from such a comprehensive and multi-disciplinary perspective, including geology, technology and art.

2. ARCHITECTURE AND SCULPTURE

The selection of stone was a very important element in the design and use of Structure 2. The design on this *tholos* reveals an 'uneven' geometry: weighs, dimensions, volumes and lithology (as well as grave goods) were used in a patterned way on both sides of the longitudinal axis that divides it in two roughly equivalent halves, a phenomenon that has been observed at other megalithic monuments in southern Iberia (Lozano Rodríguez *et al*. 2014). The design of the *tholos*, embedded in the bedrock, and the choice of building materials made it very stable. This reveals a deep empirical knowledge of the supporting capacity of the bedrock as well as the physical and mechanical properties of the stones used as construction material.

The striking diversity of lithologies in the architecture was noted early on during excavation. For this reason, samples of different rocks were taken which were later analysed through petrographic thin section (Figs. 3 and 4). Specific construction materials were used in each part of the monument. The choices involved took into consideration not only their intrinsic physical properties (resistance, mechanical and fracturing attributes, etc.) but also their external appearance (colour, texture). As a result, the architecture of this construction includes a considerable lithological diversity, a feature that, as will be shown later on, is also found in the portable material culture.

As a whole, the architecture of Structure 2 shows five main types of rocks, which were used in specific parts of the construction. All of them are available at a short distance from Palacio III:

(i) Blue and green phyllite. In total, 19 slabs made in this rock were used to line the rock-cut chamber. These slabs do not achieve any functional or structural purpose, their main aim being simply to make the chamber more beautiful and noble and, above all, to act as "canvasses" for the sophisticated graphic programme that was deployed on them (Fig. 5a and Tab. 1). Phyllite allows the production of very fine slabs of a large size and a smooth surface over which painted motifs can be made. These 19 phyllite slabs appear in two main formats: some are roughly square (Fig. 5b) while others are rectangular (Fig. 5c). The joint study of their form and the graphic motifs painted on them suggest that these slabs could also have had an anthropomorphic significance for the builders and users of the tomb.

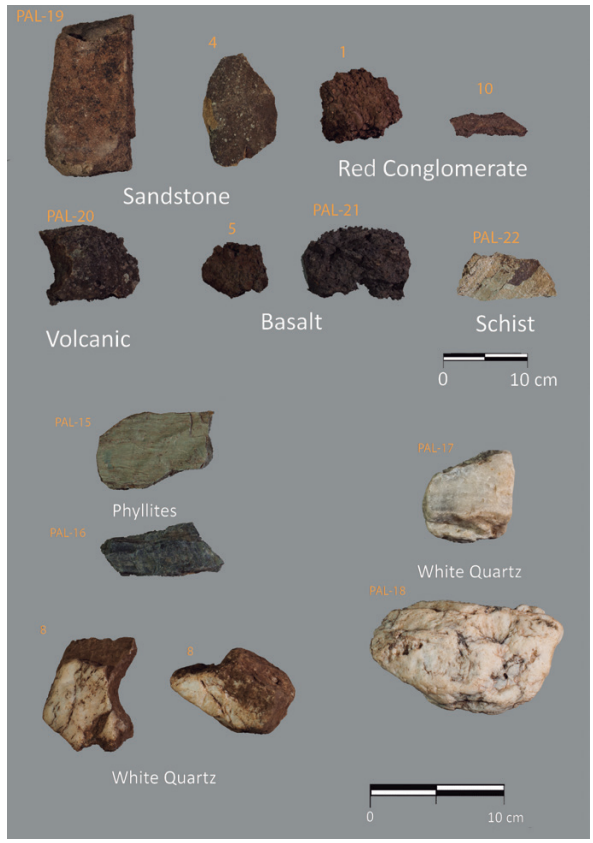

Fig. 3. Samples of construction materials from the Palacio III *tholos*. Photograph Javier Pérez González (in colour in the electronic version).

(ii) Beige coloured sandstone. This rock was used to manufacture several parallelepiped and rectangular blocs, which were then arranged onto the natural floor, just over the phyllite slabs, forming rows (Fig. 6). This arrangement of stones is particularly well preserved on the eastern side of the chamber where it reaches a width of almost one metre, with up to three or four rows of stones placed on top of each other. This architectural device can be best appreciated above slabs #13, #14 and #15 (Fig. 5a). The arrangement of these stones, each row leaning further inside than the one below it, suggests a corbelled vault. One very noticeable trait of these stones, measuring between 20 and 40 cm long and of a rather standardised size (some exceptional examples reach almost half a metre), is their long quadrangular shape, much like bricks. It is likely that sandstone was chosen to manufacture these standardised brick-shaped blocks due to its mechanical properties, which allow it to be cut with large, flat,

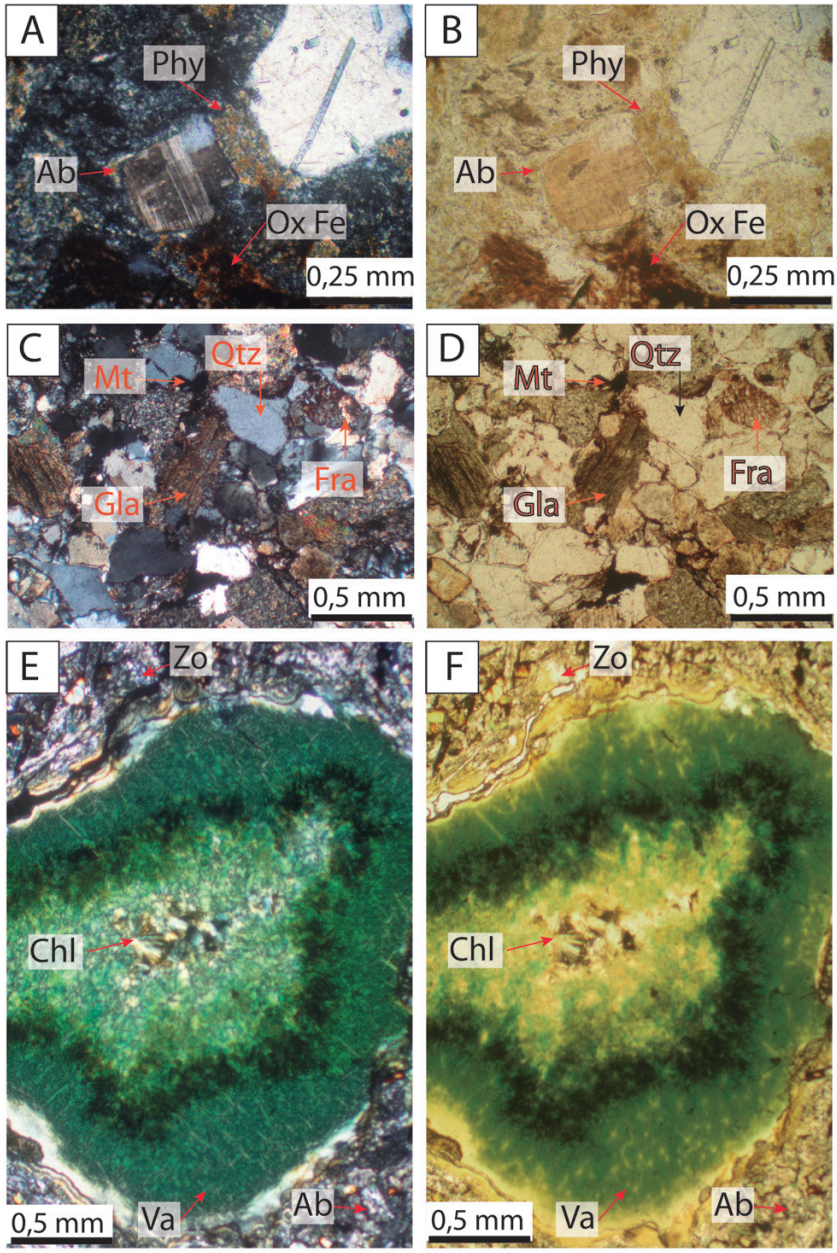

Fig. 4. Thin section micro-photographs of stone samples from the architecture of the Palacio III *tholos*: A and B: phyllite from the slabs lining the camber, formed by idiomorphic phenocrystals of albite (Ab) and other minerals of phylosillicates type (Fil) which could be phengites, as well as iron oxides (Ox Fe), within a matrix of very fine argillaceous minerals, ilmenite and chlorite (perhaps providing the greenish colour to the stone). This rock also shows detrital grains of quartz (not visible in this micro-photograph). The minerals display an orientation as a result of schistosity; C and D: Arcose from the masonry above the phyllite slabs, made of quartz (Qtz), rock fragments (Fra), phyllosilicates (Phy) and glauconite (Gla) (hydrated aluminosilicate of iron and potassium exclusively formed in marine sedimentary environments and usually in shallow water). They usually appear as rounded pellets formed by aggregations of small crystals. Quartz is monocrystalline and slightly sharp, showing some clay as matrix as well as calcitic cement. It is therefore an immature detrital sedimentary rock; E-F: Vesicular spillite accessory minerals are zoisite (Zo), sphene, hematites, actinolite, and iddingsite, with vacuolar texture. Albite phenocrystals are sericitised sphene. This type of rocks is generated in oceanic ridge environments, where very hot water alters the basaltic rocks in formation. They are therefore pillow lavas incorporated among the sediments of ophiolitic complexes. The photos on the left column have been taken with parallel nicols whereas the ones on the right column correspond to crossed nicols. Much of the mineral abbreviations are to after Kretz (1983). Design José Antonio Lozano Rodríguez (in colour in the electronic version).

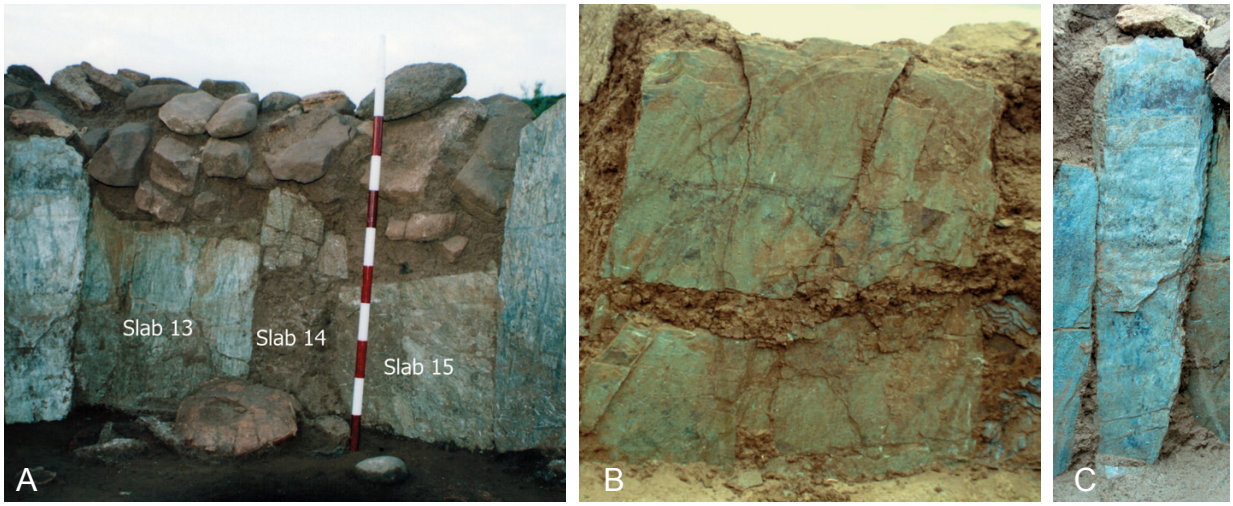

Fig. 5. The Palacio III *tholos* chamber: A. Rows of sandstone blocks possibly used as base for the roofing system, just above slabs #13, #14 and #15. Examples of phyllite slabs: B. Slab #1, C. Slab #12. Photographs Leonardo García Sanjuán (A) and David W. Wheatley (B, C) (in colour in the electronic version).

ID NUMBER	MATERIAL	MAXIMUM VERTICAL DIAMETRE (CM)	MAXIMUM HORIZONTAL DIAMETER (CM)	PAINTED MOTIFS
Slab 1	Greenish Phyllite	64	58	Triangles
Slab 2	Bluish Phyllite	--	--	Unspecified
Slab 3	Greenish Phyllite	62	54	Unspecified
Slab 4	Greenish Phyllite	62	28	Unspecified
Slab 5	Greenish Phyllite	76	36	Triangles
Slab 6	Greenish Phyllite	46	22	Triangle
Slab 7	Bluish Phyllite	72	38	Triangles
Slab 8	Bluish Phyllite	61	30	Triangles
Slab 9	Bluish Phyllite	88	22	Triangles
Slab 10	Bluish Phyllite	104	64	Triangles
Slab 11	Bluish Phyllite	82	61	Triangles
Slab 12	Bluish Phyllite	102	30	Triangles and anthropomorphic
Slab 13	Bluish Phyllite	81	60	Triangles and zigzags
Slab 14	Bluish Phyllite	77	41	Unspecified
Slab 15	Bluish Phyllite	61	50	Triangles
Slab 16	Bluish Phyllite	100	44	Triangles
Slab 17	Greenish Phyllite	94	32	Unspecified
Slab 18	Bluish Phyllite	84	42	Triangles
Slab 19	Greenish Phyllite	78	62	Triangles and zigzags

Tab. 1: Description of the phyllite slabs in the *tholos* chamber.

regular sides, as needed to place them one on top of another (with the help of clay). The rows of sandstone thus made may have been the support or base of the corbelled dome of the chamber, if this is what the roofing system of Structure 2 was like - a point that we are unable to establish conclusively.

(iii) Red conglomerate. This rock presents a very different colour, appearance and texture than the two previous ones, and was only used in a very specific part of Structure 2: the atrium. This atrium is located in the outer part of the corridor and is made of two red conglomerate uprights facing each other (on the left and right-hand sides of the entrance to the corridor) and covered by a third red-coloured capstone. These are the only stones in the whole monument made out of conglomerate and the only ones of red colour. The space created by these three red stones was physically separated from the rest of the corridor and the chamber by a gate, as proven by a groove cut onto the bedrock discovered in the excavation (Fig. 4). Furthermore, the stone located on the left-hand side of the atrium, a piece 0.96 m high and maximum 0.56 m wide, is a sculpture (stone #24 or stela #2) (Fig. 7). This remarkable stone has a morphology similar to the plaque idols that are often found in burials of the 4th and 3rd millennia BC in south-western Iberia. This was undoubtedly an apotropaic figure (perhaps female, as it seems to have carved breasts) which protected the access to the tomb. It is also interesting to note one major physical property of conglomerates: their grain size is inversely proportional to capillarity and unlike sandstones they do not transmit humidity well. Therefore, the presence of these conglomerate slabs at the entrance of the *tholos* could have also achieved a practical purpose: to stop rain water from flooding the entrance through capillarity.

(iv) Milky quartz. White quartz was found in two different places within the Palacio III *tholos* in connection with what, given their stratigraphic positions, appear to be the earliest and latest instances of its use. Firstly, an interesting nodule of white quartz was found in the 'basal chamber', a cavity cut into the bedrock, with an approximately oval base, measuring 103 cm in maximum length (from SW to NE) and 82 cm in maximum width (from NW to SE) and between 20 and 35 cm deep, which was found in the south-western quadrant of the chamber (Fig. 8). This structure was limited on its western side by 6 large stones (the biggest was 38 cm long and maximum 15 cm wide) carefully arranged together (some of them had a similar shape to the sandstones described above). On the inside of the 'basal chamber', there was a clayish filling identical to the one excavated from the chamber,

Fig. 6. Dressed blocks of sandstones, possibly used as base for the roofing system, found on primary position over phyllite slabs #13, #14 and #15 of the Palacio *tholos* chamber. Photograph Javier Pérez González (in colour in the electronic version).

Fig. 7. Stone #24 (= Stela #2) in red conglomerate. Photograph Leonardo García Sanjuán (in colour in the electronic version).

Fig. 8. The Palacio III *tholos* basal chamber before excavation: A. General per perspective from the NE; B. Detail. A to D letters designate the stones found inside this feature. Photograph Leonardo García Sanjuán (in colour in the electronic version).

and there were no remains of ashes or carbon although some parts of the bedrock showed evidence of combustion. The 'basal chamber' did contain, however, a set of five carefully arranged relatively large stones (labelled as A, B, C, D and Stela 3 in figure 12). Two of these stones stand out. Firstly, stone B is a baetyl more or less oval in shape with a sub-cylindrical section measuring 34.5 × 19.5 × 10.4 cm, showing various circular indentations, maybe carved (Fig. 9); secondly, Stela 3 is a very large piece (49 cm in maximum length and 26 cm in maximum width) and a remarkable parallelepiped shape, showing traces of paint. In addition to these stones, on the eastern side of the 'basal chamber', there was a white quartz pebble (measuring 4.7 cm of maximum diameter), very smooth to the touch and with a round shape and what appears as a flat 'base' (Fig. 10). This item, designated as 'Ornament 7' in the excavation record, was described in a previous publication (Forteza González *et al*. 2008: 141) and is very different to all others from the 'basal chamber'. It probably is a portable personal object, since it shows signs of wear on the outside (perhaps due to use or handling). Together with its physical characteristics, the remarkably prominent position of this stone above stones A, B, C and D and 'leaning' against the stones along the western edge of the 'base chamber' (Fig. 12) suggest this was an object of special symbolic value.

The second instance of the use of white quartz in the Palacio III *tholos* was recorded at the upper level of its infill, and corresponds to the latest stage of its use. In this case there were various rounded stones of white quartz near Stela 1, a sculptural piece with a powerful parallelepipedal shape that clearly follows in

Fig. 9. Stone B (baetyl) found inside the Palacio III *tholos* base chamber. Left: obverse; center: back; right: detail of the circular cup-marks. Photograph Jesús Martín Caraballo (in colour in the electronic version).

the tradition of its analogue (Stela 3) buried at the base of the tomb (Fig. 11). Around the base of Stela 1 there were various pebbles of white quartz with a maximum diameter of 10 cm, apparently laid out as a small 'cairn' to make its base more beautiful or noble.

(v) Basalt and other volcanic rocks. Lastly, among some of the dressed sandstones described above, amorphous blocks of basalt and other black volcanic rocks were found that did not appear to form any discernible pattern. These rocks have a very uneven and angular texture, featuring small cavities, a trait that, as will be explained later, characterises some unusual stone objects found near the Palacio III megalithic complex.

Altogether, the architecture and sculptures of the Palacio III *tholos* shows a wealth of stone materials including phyllite, sandstone, red conglomerate, basalt and other volcanic rocks as well milky quartz (Tab. 2). The study of the stones deposited inside the chamber revealed the presence of grauwackes, olivinic basalts and arcoses. Therefore, this monument includes many of the geological elements present in the surrounding environment: in some ways Structure 2 seems to have been designed as a 'metaphor' of the surrounding geological landscape, a theme that will be addressed in the discussion section of this paper.

Fig. 11. Milky quartz pebbles found around Stela #1 on the upper levels of the Palacio III *tholos* chamber: A. *In situ*; B. Detail. Photographs Leonardo García Sanjuán (in colour in the electronic version).

3. MATERIAL CULTURE

The assemblage of portable material culture found in Structure 2 amounts to an estimated 184 artefacts.

Fig. 10. White quartz pebble (Ornament 7) found on the eastern side of the Palacio III *tholos* base chamber. Maximum diameter: 4.7 cm. Photograph Miguel Ángel Blanco de la Rubia (in colour in the electronic version).

The most numerous categories are ceramic vessels, with 64 items (of which 48 were complete or semi-complete pots and 16 were loose fragments), and knapped lithics, with 98 items including 55 arrow-heads (Fig. 12), 22 blades (Fig. 12), 16 flake-blades, two perforators, a denticulate, a bifacial flint dagger (Fig. 13) as well as a little rock crystal blade (Fig. 14d). The technical quality of some of these items, particularly some blades, two arrow heads with long barbs and the bifacial dagger blade, are worth noting. Structure 2 also yielded three polished axes (Fig. 14a, 14b and 14c) nine stones described as baetyls or 'pseudo-spherical stones', seven personal objects designated as 'ornaments' (including five quartz objects, a perforated pendant and a perforated bead), a clay figurine (or 'idol'), a small copper object and a piece of fossilised wood. Like the architecture, the Palacio III collection of portable objects also displays a remarkable geological diversity.

Among the 97 knapped items for which raw material characterisation has been obtained, 80 were made on sedimentary rocks, of which 58 (59.8%) are flint, 16 (10.3%) are opalite and 6 (4.1%) are jasper; a further 9 items were made on metamorphic rocks, includ-

ROCK	USE	COLOUR	TEXTURE
Phyllite	Lining slabs inside the chamber and "canvass" for pictorial programme.	Bluish, Greenish	Plastic, shiny and smooth texture
Sandstone	Dressed blocks for base of chamber roofing system (and perhaps a full corbelled dome)	Beige	Rough
Conglomerate	Stones #23, #24 (Stela #2) and #31. Outer threshold or atrium exterior of the corridor; support for the 'guardian' figure of the monument.	Red	Rough and coarse, with protuberances
Quartz	Pebbles found around Stela #1 on the upper part of the chamber's infill and pebble found in base chamber.	White	Smooth and both irregular (around Stela #1) and rounded (base chamber)
Volcanic	Blocks found in the chamber's infill and mixed with the dressed sandstone blocks forming the base of the roof.	Black	Rough and vacuolar

Tab. 2: Main rocks used in the architecture of the *tholos.*

ing 8 in quartzite (8.2%), and 1 in rock crystal (1.1%), while the other 8 objects (8.2%) were made from igneous rocks, specifically rhyolite. The series of rocks used to make this collection of knapped artefacts therefore includes, flint, opalite, jasper, quartzite, rock crystal and rhyolite, most of which are not available locally.

The three polished hand-axes were made from fibrolite (axe 1), amphibolite (axe 2) and volcanic rock (axe 3). Axe 1 (Fig. 14c) is particularly interesting, as fibrolite (a variety of sillimanite, aluminosilicate) has been identified at a relatively large number of Late Prehistoric sites of the Iberian south-east (Aguayo de Hoyos *et al*. 2006; García González *et al*. 2008; García González 2014). The morphology of Axe 1 is in keeping with other published items made in the same raw material: small size (it is not bigger than 5 cm) and asymmetrical edge suggesting its use as a chisel for woodwork (García González 2014: 402). Axe 2 (Fig. 14A) (actually an adze) was made in amphibolite and shows use-wear (micro-fractures) on its edge. Copper Age amphibolite hand-axes have been described for various Iberian regions (Lillios 1997; Read *et al*. 1997; Lozano Rodríguez *et al.* 2018). Axe 3 (Fig. 14B), made of volcanic rock, shows use-wear on both ends.

The group generically classified as 'ornaments' includes seven items that may have been used as amulets or charms (five cases) or personal adornments to hang

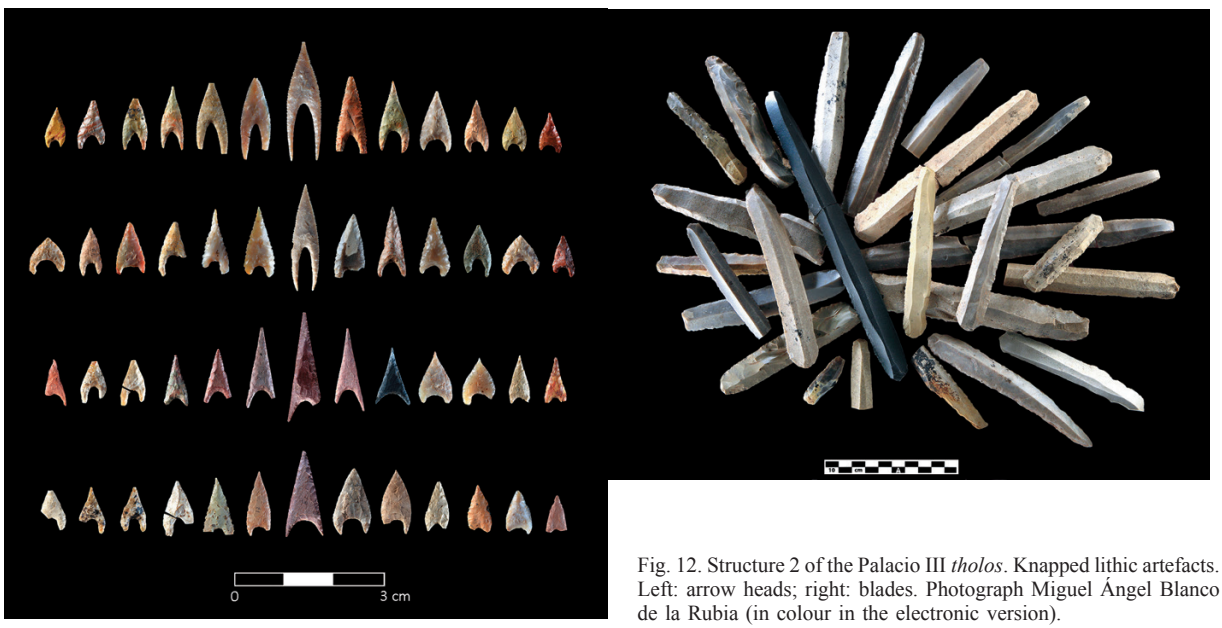

Fig. 12. Structure 2 of the Palacio III *tholos*. Knapped lithic artefacts. Left: arrow heads; right: blades. Photograph Miguel Ángel Blanco de la Rubia (in colour in the electronic version).

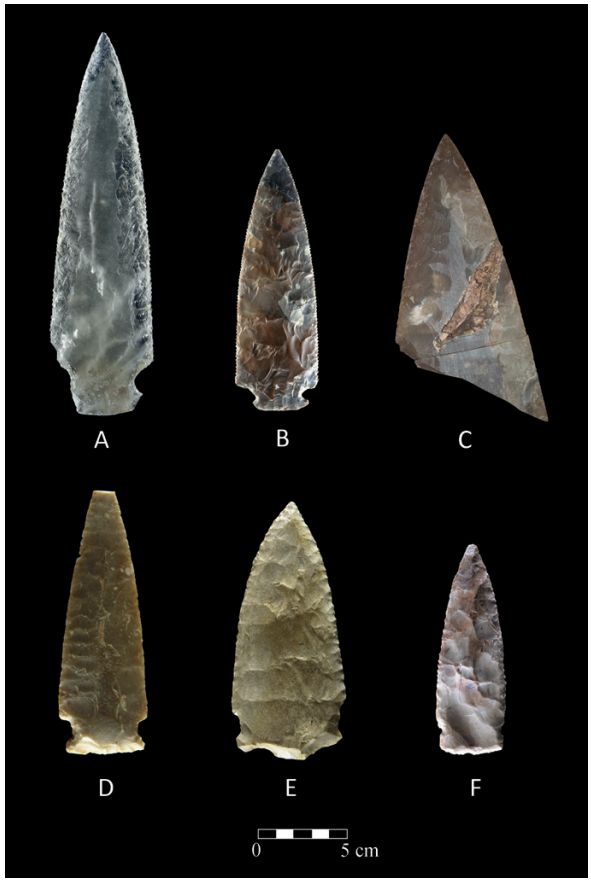

Fig. 13. Knapped lithic artefacts: The Palacio III *tholos* dagger blade compared to other similar objects found in Copper Age *tholoi* from the Andalusian provinces of Seville and Huelva: A. Upper level of Structure 10.042-10.049 from PP4-Montelirio sector at Valencina; B. Lower level of Structure 10.042-10.049 from PP4-Montelirio sector at Valencina; C. Montelirio *tholos* at Valencina; D. El Moro (Huelva); E. La Zarcita (Huelva); F. Palacio III. Photographs Miguel Ángel Blanco de la Rubia. Design Leonardo García Sanjuán (in colour in the electronic version).

from the body or from clothing (two cases). Ornaments #3, #4, #5 and #6 are made of unusual stones, including chalcedony (ornament #6) (Fig. 15A), milky quartz monocrystals (ornaments #4 and #5) (Figs. 15B and 15C) and a white quartz kidney-shaped pebble (ornament #3) (Fig. 15D). Four of them are of an intense white colour and all five have a smooth texture, as well as unusual shapes and appearances. This is specially the case with ornament #3 which, with a strongly oval shape and showing iron oxides 'veins', when looked at against the light produce a strong 'organic' effect (Fig. 15D, on the right side). It is likely that 'ornaments' #3, #4, #5 and #6 were used as personal charms, associated with specific individuals or groups and perhaps with an extended period of use before

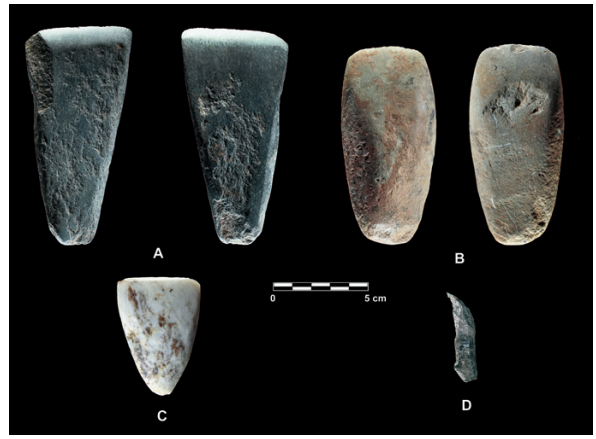

Fig. 14. Various lithics of the Palacio III *tholos*: A. Polished hand axe #2 (amphibolite); B. Polished hand axe #3 (volcanic rock); C. Polished hand axe #1 (fibrolite); D. Rock crystal micro-blade. Photographs Miguel Ángel Blanco de la Rubia (in colour in the electronic version).

being eventually deposited inside the tomb. It should be noted that, as explained above, we do not consider ornament #7 to be just another grave good from the chamber of Structure 2 *per se*, but rather an item associated with the 'basal chamber'.

An exceptional portable object is a small piece of fossilised wood, 3 cm in length (Fig. 15E), which, like some of the other 'ornaments' mentioned above, is likely to have been used as an amulet or charm. Fossil wood has rarely been described in connection to meg-

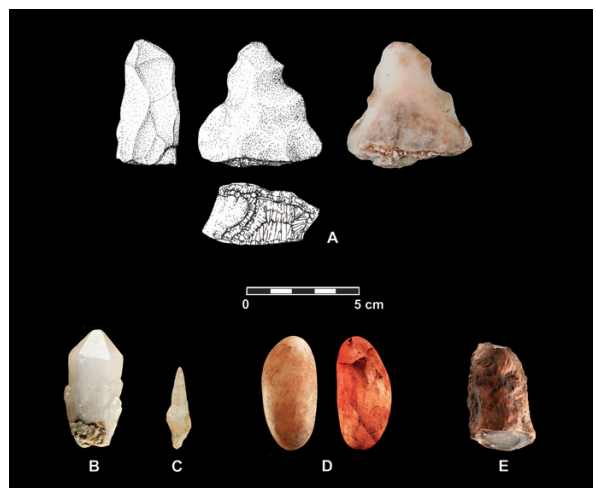

Fig. 15. Various lithics of the Palacio III *tholos*: A. Ornament #6 (chalcedony); B. Ornament #4 (milky quartz monocrystal); C. Ornament #5 (milky quartz monocrystal); D. Ornament #3 (white quartz kidney-shaped pebble with ferrous veins); E. Fossil wood. Photographs Miguel Ángel Blanco de la Rubia (in colour in the electronic version).

alithic monuments in southern Iberia, which makes this item all the more special. However, in this particular case the material is very likely to have been obtained locally. Some 6 km further down the Viar river, to the East of Palacio III, there are deposits with large-sized fossil trees. As it is well-known, fossil trees are a very rare occurrence world-wide. It seems obvious that even this very specific elements of the surrounding 'geological landscape' were known to the Chalcolithic settlers of the region, who selected them and perhaps used them as personal objects, charms or amulets.[1]

In the category of personal ornaments are also included ornaments #1 and #2, perforated beads made from muscovite and probably used as pendants. The presence of perforated beads in the Palacio III *tholos* is comparatively low, a point that will be returned to later on.

The series of stone portable artefacts from the Palacio III *tholos* ends with nine objects described as baetyls. With a pseudo-conic or oval shape (three cases) or pseudo-spheres (six cases), these artefacts are made of various types of rock, including sillimanite (three cases) microbreccia (three), spilite (two) and other volcanic rocks (one). They are also relatively small: most of them are no larger than 15 cm in diameter, except for the baetyl found in the 'base chamber', as described above, with a maximum length of 34 cm. Although many of these baetyls show signs of light roughing or little grooves, they all appear to be more or less in their natural form. They do not show use-wear traces resulting from their use as tools (for example grinding stones o hammers). Instead, they are more likely to have been symbolic objects left in the tomb as part of practices that resulted in the accumulation of dozens of medium-size and large stones in the chamber - to the tune of one metric tonne. In some cases, the morphology and raw material (spilite) of these baetyls is analogous to others found at the entrance of the Palacio III *tholos* and in the vicinity of the two other megalithic monuments located nearby, the Palacio IV and VI dolmens (Polvorinos del Río *et al*. 2002a).

While arrowheads and blades (Fig. 12) appear throughout the entire sequence of this monument, the three polished stone axes (Fig. 14) and all objects designated as "ornaments" (Fig. 15) belong to its early phase of use, which included deposition directly onto the rocky floor of the chamber, right above the 'basal chamber'. No calendar chronology is available to interpret the various stages of use of this tomb, as all attempts at obtaining radiocarbon dates have failed due to lack of collagen in the human bone.

Altogether, the collection of portable artefacts found in the Palacio III *tholos* includes a wide range of raw materials, including flint, rhyolite, jasper, opalite, muscovite, milky quartz, rock crystal, chalcedony, fossilised wood, fibrolite, amphibolite, microbreccia, spilite and other volcanic rocks (Tab. 3). Many of these raw materials are not locally available, which implies that 3rd millennium users of the Palacio III complex obtained them from other regions. This suggests that the communities settled deep into the western Sierra Morena mountain range enjoyed a degree of connectivity much higher than hitherto assumed.

4. DISCUSSION

The architecture and the sculptures associated of the Palacio III *tholos*[2] display a strongly patterned use of rock types according to their mechanical properties, colours and textures. Red conglomerate with a rough surface was reserved for the atrium; fine slabs only a few cm in thickness made from blue-green phyllite with a smooth, shiny texture were used to line the rocky sides of the chamber, and then painted with geometric motifs that gave them an anthropomorphic appearance; for the base of the chamber's roofing system (and perhaps for the corbelling) beige sandstones carved with flat bases and sides to fit together were used; lastly, nodules of white quartz were used in specific places in the monument, such as the 'basal chamber', connected to Stela #3, and in the upper part of the infill of the chamber, around Stela #1, which corresponds to the final phase of the monument..

This carefully thought-out pattern suggests that different types of rocks had different and very specific functions and symbolic meanings. In general, at Copper Age and Early Bronze Age sites of southwest Spain, metamorphic rocks such as slate, schist and phyllite seem to have been strongly linked with grave-building. At the Chalcolithic mega-site of Valencina de la Concepción, only 65 km south of Almadén de la Plata, the presence of slate or schist slabs is almost invariably associated with the presence of burials (García Sanjuán and Díaz-Zorita Bonilla 2013: 393). In the Early Bronze Age, slate and schist were often used to build cist bur-

[1] Interest and curiosity about the fossilised wood from the region, still runs high nowadays. After various failed attempts to move it, on 10 November 2015 a massive trunk of fossilised Araucaria pine wood was finally installed at the Visitor Centre of the El Berrocal Natural Park, in the town of Almadén de la Plata (Veiga 2009). This trunk is 21 m in length and weighs more than 12 t and it is assumed to have been part of a tree that could have originally been 40 m tall and was buried in a volcanic eruption in the Upper Carboniferous and the Permian, "300 million" years ago (Cornello López-Cepero 2015). This trunk was one of the main finds from the study on the paleontological analysis of the Los Melonares dam area, carried out at the same time as the archaeological survey that we conducted (García Sanjuán *et al*. 2004).

[2] Stela #2 was integrated into the architecture of the monument as the first upright of the corridor on the left-hand side when entering.

ITEM	SUGGESTED FUNCTION	MATERIAL
Ornament 1	Personal ornament	Muscovite
Ornament 2	Personal ornament	Muscovite
Ornament 3	Amulet or charm	Quartz
Ornament 4	Amulet or charm	Milky quartz
Ornament 5	Amulet or charm	Milky quartz
Ornament 6	Amulet or charm	Chalcedony
Ornament 7	Amulet or charm	White quartz
Lithic 14	Amulet or charm	Fossil wood
Hand axe 1	Tool?	Fibrolite
Hand axe 2	Tool	Amphibolite
Hand axe 3	Tool	Volcanic rock
Betil 1	Cult object?	Sillimanite
Betil 2	Cult object?	Sillimanite
Betil 3	Cult object?	Microbreccia
Betil 4	Cult object?	Microbreccia
Betil 5	Cult object?	Spilite
Betil 6	Cult object?	Spilite
Betil 7	Cult object?	Microbreccia
Betil 8	Cult object?	Sillimanite
Betil 9	Cult object?	Volcanic rock

Tab. 3: Function and raw materials used for non-knapped lithic artefacts.

ials in the provinces of Seville and Huelva. The Palacio III *tholos* clearly shows that, lacking as they do a structural function (they did not support any weight), the role that these slabs played was to provide a smooth, even and 'noble' surface (literally, a "canvass") over which graphic motifs could be painted, hence conveying notions of ancestry and mythology (Bueno Ramírez *et al*. 2013). It should be remembered that these materials were also commonly used to manufacture the so-called 'plaque idols' that, painted or engraved with geometric motifs very similar to those on the slabs in the Palacio III *tholos*, did also evoke deities or ancestors (Bueno Ramírez and Balbín Behrmann 1992; Bueno Ramírez *et al.* 2008; Lillios 2008; Bueno Ramírez 2010).

White quartz also seems to have had a very definite function and/or symbolic meaning at the Palacio III *tholos*. This raw material was used to highlight the location of Stelae #1 and #3, as well as personal objects (monocrystals). As discussed in a previous paper (Forteza González *et al*. 2008) there are numerous examples of the use of white quartz in megalithic monuments throughout southern Iberia. A close example is Tomb 7055 (another *tholos*) at La Orden-El Seminario (Huelva) where large accumulations of white quartz pebbles were found both in the entrance to the corridor and in the chamber, producing a marked contrast between the white of the quartz and the dark of the slate slabs used in the construction (García Sanjuán and Linares Catela 2009: 151). Furthermore, the study of the find spot of two ´warrior´ stelae found a mere 3 km to the Northeast of Palacio III as the crow flies showed the presence of several hundred white quartz pebbles around the clearance cairn where both stelae were found (García Sanjuán *et al*. 2006b: 145). Is it entirely coincidental that at Almadén de la Plata, at a very short distance from each other, there are two sites with prehistoric stelae that are formally different (and chronologically distant) associated with white quartz pebbles? As it has been claimed, the tradition of monumentalising sites with white quartz, first occurring as part of the megalithic phenomenon, continued into the Bronze Age and the Iron Age. The use of certain rock types seems to have provided a sense of cultural continuity, even within sharply different cultural backgrounds (Bueno Ramírez *et al*. 2005, 2007; García Sanjuán 2011: 542-544).

Regarding the use of the red conglomerate, its unmistakable red colour must have played a key role in their choice. Although in Iberia there are no published parallels of the architectural use of red conglomerate in megaliths of the 4th and 3rd millennia BC, there is plenty of evidence of the intense use of red colour – through pigments. This topic has been widely studied (Rubio de Miguel 1989; Domínguez-Bella 2010; Hunt Ortiz and Hurtado Pérez 2010; Briceño Briceño 2011; Lazarich González *et al*. 2010; Domingo-Sanz *et al*. 2012; Inacio *et al*. 2013; Briceño Briceño *et al*. 2013, 2015; Emslie *et al*. 2015, 2016; etc.). Not far from Almadén de la Plata, red colour had an important role in some of the large *tholos*-type monuments of Valencina de la Concepción (Rogerio-Candelera *et al*. 2013; Bueno Ramírez *et al*. 2016; García Sanjuán *et al*. 2016a). This is particularly true of the beautifully dressed slate slabs lining the large chamber of Montelirio, which were coated with a thick layer of cinnabar paint (Bueno Ramírez *et al*. 2016: 366-374; García Sanjuán *et al*. 2016a: 537-538). In this sense, it is interesting that no traces of red pigment were found in the Palacio III *tholos*. This may have been due to a cultural choice made by the communities that used this tomb or else because they could not access or afford the necessary raw materials. Red conglomerate may have been an alternative to using red pigments to cover the stones in order to make them look like the slates in the large chamber from the Montelirio *tholos*. It is important

to note that in the Palacio III *tholos*, red colour was clearly reserved for one space in the monument, and that space only: the atrium. This differs clearly from the pattern seen at Montelirio, where all slabs in the main chamber were made to look red by coating them.

Furthermore, the use of red conglomerate in the Palacio III *tholos* may be further nuanced by the fact that this material was widely used in the architecture of the earlier Palacio III dolmen (Structure 1), located barely 10 m to the west of the *tholos*. In fact, it is tempting to think that these particular elements of the *tholos* are a re-utilisation of some of the stones missing from the dolmen. This practice has been documented in other Iberian megaliths such as Katillotxu, in the Basque Country (Bueno Ramírez *et al*. 2009): here a later dolmen displays materials probably re-used from an earlier dolmen located in the same mound.

A similar pattern of specific choices and selections applies in the portable material culture. In this case, however, apart from reflecting the complex geology of the region, the assemblage includes raw materials brought from further afield. Among the materials found, there is spilite, a rock previously described in connection with cult objects found around the megaliths from Dehesa de Palacio (Polvorinos del Río *et al*. 2002a). The small piece of fossilised wood, which does not appear to have been worked, stands out because of its local character as well as its rarity. Fossilised wood is an exceptionally rare material, which is only found in a handful of locations around the world. Apparently, its presence in the Viar river basin was not unbeknownst to the Chalcolithic settlers of the region.

Among the non-local raw materials, blades and arrowheads were manufactured on flint from Sierra de Malaver (Málaga), the Campo de Gibraltar Complex (Cádiz) and the 'Milanos Formation' (Granada), up to nearly 300 km away from Almadén de la Plata. Altogether, the sourcing of this flint matches well what has been revealed at major Copper Age settlements of southern Iberia such as Los Millares (Lozano Rodríguez *et al*. 2010; Afonso Marrero *et al*. 2011) and Valencina (García Sanjuán *et al.* 2016b), suggesting that the small communities settled deep in the western Sierra Morena mountain range had access to the same raw materials than communities living at larger settlements located in better connected areas and endowed with better agricultural resources. Other non-local raw materials are the rock crystal micro-blade, the two milky quartz monocrystals, the perforated muscovite pendant and bead, the chalcedony amulet or the amphibolite hand axe. The few studies available on Copper Age rock crystal technology show that potential sources are far and between (Morgado Rodríguez *et al*. 2016). Regarding fibrolite, no sources exist either in the Western Sierra Morena or in the Iberian southwest, which means that we can reasonably conclude that this stone came from one of the locations suggested in the literature, such as Serranía de Ronda (Málaga) or Hoyazo de Nijar (Almería) (García González 2014: 399).

Concerning the use or function given to the objects manufactured in 'distant' raw materials, it is worth noting the presence of a small but important series of what were probably 'personal objects', including white quartz monocrystals, fossilised wood, a nodule of chalcedony, etc. Many of these items have in common the intense white colour and smooth texture, as well as an unusual or 'striking' aspects; this is especially noticeable in 'ornament 3', which has various streaks of iron oxides that produce an intense 'organic' effect when held against the sunlight. Similarly, there are various objects that could be labelled as ideotechnic artefacts, as with the nine elements of sillimanite, microbreccia, spilite and volcanic rock in a pseudo-spherical or oval form, the large baetyl and the small nodule of white quartz from the 'basal chamber'.

In the Palacio III *tholos* there is a noticeable scarcity of perforated beads. In south-west Spain, megalithic monuments of the 4th and 3rd millennia BC often include hundreds if not thousands of perforated beads. To list but a few examples: 1589 perforated beads were found at the Alberite dolmen (Villamartín, Cádiz) (Domínguez Bella and Morata Céspedes 1995, 1996; Domínguez Bella *et al*. 1997, 2001), while in Tomb 3 at La Pijotilla (Solana de los Barros, Badajoz) 657 were counted (Polvorinos del Río *et al*. 2002b), and in the dolmens in El Pozuelo (Huelva) hundreds were also recorded. The most accomplished example of this practice is, again, Montelirio, where tens of thousands of perforated beads were used to weave ceremonial mantles or clothing deposited in the Large Chamber (Díaz-Guardamino *et al*. 2016). Once again, with respect to the configuration of the portable material culture deposited in the tomb, Structure 2 shows a definite personality. This must have resulted from a combination of social circumstances, cultural patterns and personal choices made by the community (or communities) that built and used the tomb. Against the large numbers of perforated beads in the some of the collective burial sites of 4th and 3rd millennia, the Palacio III *tholos* stresses the importance of stones with unusual shapes, striking colours and suggestive external appearances, probably used as charms and amulets.

5. CONCLUSION

The broad-spectrum study of the stone materials used in the architecture, sculptures and portable material culture of the Palacio III *tholos* tomb leads to a number of conclusions.

(1) The communities that designed, constructed and used this monument had access to a remarkably broad range of abiotic resources. The list of rocks used in the architecture and portable material culture is very long. As architectural elements it includes phyllite, sandstone, red conglomerate, arcose, basalt and other volcanic rocks, milky quartz and white granite; portable artefacts were made of flint, opalite, jasper, pink quartzite, rock crystal and rhyolite among the knapped lithic tools and fossilised wood, chalcedony, muscovite, milky quartz, fibrolite, amphibolite, spilite, microbreccia and limonite among the other artefacts. This list of abiotic resources should also include copper - only one small item of this metal was found in the tomb. These raw materials are both local and non-local, which suggests that the local populations had broad knowledge of the lithic resources locally available to them, as well as access to exchange networks for non-local materials. Evidence of this diversity of raw materials is widespread among late megalithic monuments of southern Iberia, in the context of a marked increase in the making and exhibition of personal ornaments and prestige objects (Bueno Ramírez *et al*. 2010; Martínez Fernández 2016).

(2) The architecture of the *tholos* appears to mirror the rich geology of the surrounding region. All of the rocks used in the architecture are available locally, while, at the same time, many of the elements of the surrounding 'lithological landscape' are present in the construction – each with a very specific purpose. This reveals that local communities had a very accurate knowledge of their geological landscape and they developed precise cultural, technical, ideological and even emotional ties with it. The diversity of raw materials in the architecture matches what is found in the portable material culture. This underlines the social investment made in the construction and maintenance of this burial complex, which lived on to have a long biography well into the Iron Age.

(3) Some of the artefacts found in the Palacio III *tholos* conclusively show that Copper Age people were very curious about (and sensitive to) rocks with striking shapes, textures and colours. This is the case with ornaments #3, #4, #5, #6 and #7 as well as other lithic pieces, such as the fossilised wood, the fragment of limonite, etc. Ornament #3 has a strange oval shape and is noticeably translucent, showing a remarkable 'organic' texture when held up to the light; ornaments #4 and #5 have prismatic shapes and striking colour; ornament #7, in turn, has a pseudo-spherical shape and an outstanding white colour; some of the baetyls and pseudo-spherical stones, especially the spilites, have a duality of concentric textures inside them.

(4) Given the carefully defined patterns in the selection of stone materials for the architecture and portable material culture, the different uses given to them, the strong contrast between the textures of the rocks (smooth-rough, straight-rounded, dark-light, etc.), colours (green, blue, beige, red, white, black) and the combination of the architecture, sculpture and painting across the monument, it seems likely that, as well as being selected because of their physical and mechanical properties, each of the raw materials was endowed with a specific meaning or symbolism within the worldview the funerary practices were part of. This is fully in line with recent findings concerning the roles colours played in megalithic architecture across Europe (Bueno Ramírez and Balbín Behrmann 1997; Jones 1999; Owoc 2002; Scarre 2002; Rojo Guerra *et al*. 2005, 2013; Bueno Ramírez *et al.* 2015; etc.).

(5) The combination of construction elements and sculptural pieces made from different raw materials, shapes, textures and decorative elements must have generated an intense effect of symbolic references inside the monument. This artistic and sensorial 'overload' is most clearly present at the magnificent Montelirio *tholos*, where colours, solar light, painted motifs, sculptures and offerings were combined in a highly 'choreographed' way in order to create a powerful atmosphere. At a more modest scale, the Palacio III *tholos* also shows how stone was used to full effect in order to create the basis for the scenography required by the social practices it provided the stage for.

As a whole, the study of the stone elements found in the Palacio III *tholos* suggests that the communities that built it and used it had access to 'foreign' resources, including materials that came from hundreds of km away. In addition, they also had an intense connection with the landscape surrounding them, a landscape that provided the materials used to build the final resting place of the dead. This duality of cultural experiences suggests that, although living in a relatively isolated region, deep in the Western Sierra Morena mountain range, they had access to exchange networks for abiotic resources that stretched out across southern Iberia and perhaps even further afield. Given that the Viar river basin is not a region that was often passed through, it can be reasonably assumed that these people regularly participated in social practices that took place in nearby central places, such as for example the Valencina mega-site, located only a day and half's walk away, and which probably acted as the 'gateway' giving them reach to people, goods and informations from distant lands.

ANNEX: COMPLEMENTARY FILE

In the electronic version, a figure is available as complementary material:

CF1. Location map of the Palacio III megalithic complex (Seville) on the local geological cartography. Design José Antonio Lozano Rodríguez.

BIBLIOGRAPHY

Afonso Marrero, J. A.; Cámara Serrano, J. A.; Martínez Fernández, G. and Molina González, F. 2011: "Objetos en materias primas exóticas y estructura jerárquica de las tumbas de la necrópolis de Los Millares (Santa Fe de Mondújar, Almería, España)". In L. García Sanjuán, C. Scarre and D. Wheatley, D. (eds.): *Exploring time and matter in prehistoric monuments: absolute chronology and rare rocks in european megaliths*. Menga Extra 1, Junta de Andalucía. Sevilla: 295-332.

Aguayo de Hoyos, P.; Puga Rodríguez, E.; Lozano Rodríguez, J. A.; García González, J. D. and Carrión Méndez, F. 2006: "Caracterización de fuentes de materias primas para la elaboración de herramientas de sillimanita, de los yacimientos de la Depresión de Ronda, durante la Prehistoria Reciente". In G. Martínez Fernández, A. Morgado Rodríguez and J. A. Afonso Marrero (eds.): *Sociedades prehistóricas, recursos abióticos y territorio. Actas de la III Reunión de trabajo sobre el aprovisionamiento de recursos abióticos en la Prehistoria (Loja 2004)*: 249-277. Granada.

Briceño Briceño, E. M. 2011: "La versatilidad de los colorantes minerales rojos en la Prehistoria Reciente: Andalucía occidental". In J. Abellán Pérez, M. Lazarich González and V. Castañeda Fernández (eds.): *Homenaje al Profesor Antonio Caro Bellido. I, Prehistoria y Protohistoria de Andalucía y Levante*. Universidad de Cádiz. Cádiz: 39-60.

Briceño Briceño, E. M.; Lazarich González, M. and Feliú Ortega, M. J. 2013: "Reconstrucción de los procesos de captación y transformación de minerales para la elaboración de colorantes rojos a partir de la documentación de los yacimientos prehistóricos en la provincia de Cádiz". In J. Jiménez Ávila, M. Bustamante and M. García Cabezas (eds.): *Actas del VI Encuentro de Arqueología del Suroeste Peninsular (Villafranca de los Barros, Badajoz 2012)*: 431-462. Villafranca de los Barros, Badajoz.

Briceño Briceño. E. M.; Lazarich González, M. and Fernández De La Gala, J. V. 2015: "Observaciones e hipótesis sobre diversas funciones de los ocres en cinco yacimientos neolíticos de la provincia de Cádiz". In V. Dos Santos Gonçalves, M. Diniz and A. N. Sousa (eds.): *Actas do 5 Congresso do Neolítico Peninsular (Lisboa 2011)*: 429-437. Lisboa

Bueno Ramírez, P. 2010: "Ancestros e imágenes antropomorfas muebles en el ámbito del megalitismo occidental: las placas decoradas". In C. Cacho Quesada, R. Maicas Ramos, E. Galán and J. E. Martos (eds.): *Ojos que nunca se cierran. Ídolos en las primeras sociedades campesinas*. Ministerio de Cultura. Madrid: 39-77.

Bueno Ramírez, P.; Barroso Bermejo, R.; Balbín Behrmann, R. de; López Quintana, J. C. and Guenaga Lisazu, A. 2009: "Frontières et art mégalithique. Une perspective depuis le monde pyrenéen". *L'Anthropologie* 113 (5): 882-929. https://doi.org/10.1016/j.anthro.2009.09.010

Bueno Ramírez, P. and Balbín Behrmann, R. de 1992: "Art mégalithique dans la Péninsule Ibérique. Une vue d'ensemble". *L'Anthropologie 96* (2-3): 499-572.

Bueno Ramírez, P. and Balbín Behrmann, R. de 1997: "Arte megalítico en sepulcros de falsa cúpula. A propósito del monumento de Granja de Toniñuelo (Badajoz)". Actas del III Congreso Internacional de Arte Megalítico (A Coruña 1997) *Brigantium* 10: 91-121.

Bueno Ramírez, P.; Balbín Behrmann, R. de and Barroso Bermejo, R. 2005: "Hierarchisation et métallurgie: statues armées dans la Péninsule Ibérique". *L'Anthropologie* 109: 577-640. https://doi.org/10.1016/j.anthro.2005.09.009

Bueno Ramírez, P.; Balbín Behrmann, R. de and Barroso Bermejo, R. 2007: "Chronologie de l'art mégalithique ibérique: C14 et contextes archéologiques". *L' Anthropologie* 111: 590-654. https://doi.org/10.1016/j.anthro.2007.07.006

Bueno Ramírez, P.; Balbín Behrmann, R. de and Barroso Bermejo, R. 2008: "Dioses y antepasados que salen de las piedras". L. García Sanjuán (ed.): Patrimonio megalítico: más allá de los límites de la Prehistoria *Boletín del Instituto Andaluz del Patrimonio Histórico* 67: 62-67.

Bueno Ramírez, P.; Balbín Behrmann, R. de and Barroso Bermejo, R. 2010: "Megalitismo en la cuenca interior del Tajo". *Munibe* 32: 152-167.

Bueno Ramírez, P.; Balbín Behrmann, R. de and Barroso Bermejo, R. 2013: "Símbolos para los muertos, símbolos para los vivos. Arte megalítico en Andalucía". *Actas del II Congreso de arte rupestre esquemático en la península ibérica (Los Vélez 2010)*: 25-47. Los Vélez. Almería.

Bueno Ramírez, P.; Balbín Behrmann, R. de and Barroso Bermejo, R. 2015: "Graphic programs as ideological construction of the megaliths: the south of the Iberian Peninsula as case study". In L. Rocha, P. Bueno Ramírez and G. Branco (eds.): *Death as Archeology of Transition: thoughts and materials. Papers from the II International Conference of Transition Archaeology: Death Archaeology (29th April-1*st *May 2013)*. British Archaeological Reports, International Series 2708, Archaeopress. Oxford: 52-69.

Bueno Ramírez, P.; Balbín Behrmann, R. de; Barroso Bermejo, R.; Carrera Ramírez, F. and Hunt Ortiz, M. A. 2016: "El arte y la plástica en el *tholos* de Montelirio". In Á. Fernández Flores, L. García Sanjuán and M. Díaz-Zorita Bonilla (eds.): *Montelirio: un gran monumento megalítico de la Edad del Cobre*. Arqueología. Monografías, Junta de Andalucía. Sevilla: 365-404.

Cornello López-Cepero, A. 2015: "El tronco de Almadén tiene 300 millones de años". *ABC de Sevilla* 7 de octubre.

Díaz-Guardamino Uribe, M.; Wheatley, D. W.; Williams, E. F. and Garrido Cordero, J. Á. 2016: "Los textiles elaborados con cuentas perforadas de Montelirio". In Á. Fernández Flores, L. García Sanjuán and M. Díaz-Zorita Bonilla (eds.): *Montelirio: un gran monumento megalítico de la Edad del Cobre*. Arqueología. Monografías, Junta de Andalucía. Sevilla: 345-364.

Díaz-Zorita Bonilla, M.; Waterman, A. J. and Knudson, K. J. 2009: "Explorando la movilidad y los patrones dietarios en una comunidad de la Edad del Cobre: estudio preliminar bioarqueológico del *tholos* de Palacio III (Almadén de la Plata, Sevilla)". In M. Polo Cerdá and E. García-Prosper (eds.): *Investigaciones histórico-m*édicas sobre *salud y enfermedad en el pasado. Actas del IX Congreso Nacional de Paleopatología (Morella, Castelló 2007)*: 669-676. Valencia.

Domingo Sanz, I.; García-Borja, P. and Roldán, C. 2012: "Identification, processing and use of red pigments (hematite and cinnabar) in the Valencian Early Neolithic (Spain)". *Archaeometry* 54 (5): 868-892.

Domínguez-Bella, S. 2010: "Aplicaciones de las técnicas experimentales y la mineralogía a la arqueometría. Los pigmentos de cinabrio del dolmen de Alberite I, Villamartín (Cádiz)". In S. Domínguez-Bella, J. Ramos Muñoz, J. M. Gutiérrez López and M. Pérez Rodríguez (eds.): *Minerales y Rocas en las Sociedades de la Prehistoria*. Universidad de Cádiz. Cádiz: 235-244.

Domínguez Bella, S.; Álvarez Rodríguez, M. A. and Ramos Muñoz, J. 2001: "Estudio analítico de las cuentas de collar de ámbar del Dolmen de Alberite (Villamartín, Cádiz): naturaleza química y mineralógica e implicaciones sobre su origen". In B. Gómez Tubío, M. A. Respaldiza Galisteo and M. L. Pardo Rodríguez (eds.): *Actas del III Congreso Nacional de Arqueometría (Sevilla 1999)*: 621-630. Sevilla.

Domínguez-Bella, S. and Morata Céspedes, D. 1995: "Aplicación de las técnicas mineralógicas y petrológicas a la arqueometría. Estudio de materiales del Dolmen de Alberite (Villamartín, Cádiz)". *Zephyrus* 48: 129-142.

Domínguez-Bella, S. and Morata Céspedes, D. 1996: "Caracterización mineralógica y petrológicas de algunos objetos de ajuar y de los recubrimientos de las paredes y suelos de la cámara (materiales líticos y ocres". In J. Ramos Muñoz and F. Giles Pacheco (eds.): *El Dolmen de Alberite (Villamartín, Cádiz). Aportaciones a las formas económicas y sociales de las comunidades neolíticas en el noroeste de Cádiz*. Universidad de Cádiz. Cádiz: 187-206.

Domínguez-Bella, S.; Morata Céspedes, D.; Ramos Muñoz, J. and Rosa, J. de la 1997: "Caracterización mineralógica de las cuentas verdes del Neolítico de la provincia de Cádiz". *Boletín de la Sociedad Española de Mineralogía* 20 (1): 149-150.

Emslie, S. D.; Brasso, R.; Patterson, W.; Valera, A. C.; Mckenzie, A.; Silva, A. M.... and Blum, J. D. 2015: "Chronic mercury exposure in Late Neolithic/Chalcolithic populations in Portugal from the cultural use of cinnabar". *Scientific Reports* 5, art. 14679. https://doi.org/10.1038/srep14679

Emslie, S.; Mckenzie, A. C. and Shaller, H. 2016: "Análisis de mercurio de los restos humanos del *tholos* de Montelirio". In Á. Fernández Flores, L. García Sanjuán and M. Díaz-Zorita Bonilla (eds.): *Montelirio: un gran monumento megalítico de la Edad del Cobre*. Arqueología. Monografías, Junta de Andalucía. Sevilla: 449-454.

Forteza González, M.; García Sanjuán, L.; Hernández Arnedo, M. J.; Salguero Palma, J. and Wheatley, D. 2008: "El cuarzo como material votivo y arquitectónico en el complejo funerario megalítico de Palacio III (Almadén de la Plata, Sevilla. Análisis contextual y mineralógico". *Trabajos de Prehistoria* 65 (2): 135-150. https://doi.org/10.3989/tp.2008.08008

García González, D. 2014: "Circulación de herramientas elaboradas en fibrolita en el Sureste de la Península Ibérica durante la Prehistoria Reciente". In E. García Alfonso (ed.): *Movilidad, contacto y cambio. Actas del II Congreso de Prehistoria de Andalucía (Antequera 2012)*: 399-406. Sevilla.

García González, D.; Lozano Rodríguez, J. A.; Carrión Méndez, F.; Moreno Jiménez, F. and Terroba Valadez, J. 2008: "Las herramientas de piedra pulimentada elaboradas en silimanita: materia prima, tecnología y experimentación". In M. S. Hernández Pérez, J. A. Soler Díaz and J. A. López Padilla (eds.): *Actas del IV Congreso del Neolítico Peninsular (Alicante 2006)*: 277-281. Alicante.

García Sanjuán, L. 2005: "Grandes piedras viejas, memoria y pasado. Reutilizaciones del Dolmen de Palacio III (Almadén de la Plata, Sevilla) durante la Edad del Hierro". In S. Celestino Pérez and J. Jiménez Ávila (eds.): *El Periodo Orientalizante. Actas del III Simposio Internacional de Arqueología de Mérida. Protohistoria del Mediterráneo Occidental (Mérida 2003)*. Anejos de Archivo Español de Arqueología 35. CSIC. Madrid: 595-604.

García Sanjuán, L. 2011: "The warrior stelae of the Iberian South-west: Symbols of power in ancestral landscapes". In T. Moore and L. Armada Pita (eds.): *Atlantic Europe in the First Millennium BC: Crossing the Divide*. Oxford University Press. Oxford: 534-557.

García Sanjuán, L. and Hurtado Pérez, V. 2001: "La arquitectura de las construcciones funerarias de tipo *tholos* en el Suroeste de España. Investigaciones recientes". In G. Serrelli and D. Vacca (eds.): *Aspetti del megalitismo prehistórico, Actas del Incontro di Studio Sardegna-Spagna (Lunamatrona, Cagliari, Italia 2001)*: 36-47. Dolianova.

García Sanjuán, L. and Linares Catela, J. A. 2009: "Huelva". In L. García Sanjuán and B. Ruiz González (eds.): *Las grandes piedras de la Prehistoria. Sitios y paisajes megalíticos de Andalucía*. Junta de Andalucía. Sevilla: 140-183.

García Sanjuán, L. and Díaz-Zorita Bonilla, M. 2013: "Prácticas funerarias en estructuras negativas en el asentamiento prehistórico de Valencina de la Concepción (Sevilla, España): análisis contextual y osteoarqueológico". In L. García Sanjuán, J. M. Vargas Jiménez, V. Hurtado Pérez, T. Ruiz Moreno and R. Cruz-Auñón Briones (eds.): *El asentamiento prehistórico de Valencina de la Concepción (Sevilla): investigación y tutela en el 150 aniversario del descubrimiento de La Pastora.* Universidad de Sevilla. Sevilla: 387-403.

García Sanjuán, L.; Fernández Flores, Á. and Díaz-Zorita Bonilla, M. 2016a: "Montelirio. Valoración e Interpretación de una tumba excepcional". In Á. Fernández Flores, L. García Sanjuán and M. Díaz-Zorita Bonilla (eds.): *Montelirio: un gran monumento megalítico de la Edad del Cobre*. Arqueología. Monografías, Junta de Andalucía. Sevilla: 503-553.

García Sanjuán, L.; Lozano Rodríguez, J. A.; Sánchez Liranzo, O.; Gibaja Bao, J. F. and Aranda Sánchez, V. 2016b: "La industria lítica del *tholos* de Montelirio". In Á. Fernández Flores, L. García Sanjuán and M. Díaz-Zorita Bonilla (eds.): *Montelirio: un gran monumento megalítico de la Edad del Cobre*. Arqueología. Monografías, Junta de Andalucía. Sevilla: 203-244.

García Sanjuán, L.; Lozano Rodríguez, J. A.; Rivera Jiménez, T.; Calvo Rebollar, M.; Martínez-Sevilla, F.; Rodríguez-Rellán, C. and Verdugo Escamilla, C. 2020: "The finest green: The Iron Age quartz prase monocrystal from the Palacio III megalithic complex (Seville, Spain)". In C. Rodríguez-Rellán, B. Nelson and R. Fábregas Valcarce (eds.): *A taste for green: a global perspective on ancient jade, turquoise and variscite exchange.* Oxbow. Oxford.

García Sanjuán, L.; Metcalfe-Wood, S.; Rivera Jiménez, T. and Wheatley, D. W. 2006a: "Análisis de pautas de visibilidad en la distribución de monumentos megalíticos de Sierra Morena occidental". In I. Grau Mira (ed.): *La aplicación de los SIG en la Arqueología del Paisaje*. Universidad de Alicante. Alicante: 181-200.

García Sanjuán, L. and Vargas Durán, M. A. 2004: "El paisaje de las grandes piedras. Proyecto de documentación de los monumentos megalíticos de Almadén de la Plata (Sevilla)". In *Actas de las VII Jornadas Andaluzas de Difusión del Patrimonio Histórico (Huelva 2002)*: 335-352. Sevilla.

García Sanjuán, L.; Vargas Duran, M. A. and Wheatley, D. W. 2004: "Prospecciones de superficie en la zona de afección del embalse de Los Melonares (Almadén de la Plata, El Pedroso y Castilblanco de los Arroyos, Sevilla)". *Anuario Arqueológico de Andalucía/2001,* III. *Actividades de Urgencia*. Junta de Andalucía. Sevilla: 962-972.

García Sanjuán, L. and Wheatley, D. W. 2003: "Obtención de micro-topografías de alta precisión de yacimientos arqueológicos mediante DGPS". *Mapping. Revista de Cartografía, Sistemas de Información Geográfica, Teledetección y Medio Ambiente* 89 (octubre): 94-98.

García Sanjuán, L. and Wheatley, D. 2006: "Recent investigations of the megalithic landscapes of Sevilla province, Andalusia: Dolmen de Palacio III". In R. Joussaume, L. Laporte and C. Scarre (eds.): *Origin and development of the megalithic phenomenon of Western Europe. Proceedings of the International Symposium (Bougon, France 2002)*: 473-484. Niort.

García Sanjuán, L.; Wheatley, D. W.; Fábrega Álvarez, P.; Hernández Arnedo, M. J. and Polvorinos del Río, A. 2006b: "Las estelas de guerrero de Almadén de la Plata (Sevilla). Morfología, tecnología y contexto". *Trabajos de Prehistoria* 63 (2): 135-152. https://doi.org/10.3989/tp.2006.v63.i2.21

Hunt Ortiz, M. and Hurtado Pérez, V. 2010: "Pigmentos de sulfuro de mercurio (cinabrio) en contextos funerarios de época calcolítica en el sur de la península ibérica: investigaciones sobre el uso, depósitos minerales explotados y redes de distribución a través de la caracterización composicional e isotópica". In M. E. Sainz Carrasco, R. López Romero, M. A Cano Díaz-Tendero and J. C. Calvo García (eds.): *Actas del VIII Congreso Ibérico de Arqueometría (Teruel 2009)*: 123-132. Teruel.

Inacio, N.; Nocete Calvo, F.; Nieto Liñán, J. M.; Saez, R.; Rodríguez Bayona, M.and Peramo, P. 2013: "A presencia de cinabrio em contextos megalíticos do Sul de Portugal." In J. Jiménez Avila, M. Bustamante-Álvarez and M. García Cabezas (eds.): *Actas del VI Encontro de Arqueología do Sudoeste* (Villafranca de los Barros, Badajoz 2012): 418-430. Villafranca de los Barros.

Jones, A. 1999: "Local colour: megalithic architecture and colour symbolism in Neolithic Arran". *Oxford Journal of Archaeology* 18 (4): 339-350. https://doi.org/10.1111/1468-0092.00088

Kretz, R. 1983: "Symbols of rock-forming minerals". *American Mineralogist* 68, 277-279.

Lazarich González, M.; Briceño Briceño, E. M. and Feliú Ortega, M. J. 2010: "El empleo de ocres en las sepulturas prehistóricas de la Baja Andalucía: la necrópolis de Paraje de Monte Bajo." In J. A. Pérez Macías, and E. Romero Bomba (eds.): *Actas del IV Encuentro de Arqueología del Suroeste Peninsular (Aracena 2008):* 18. Huelva,

Lillios, K. 1997: "Amphibolite tools of the Portuguese Copper Age (3000-2000 BC): A geoarchaeological approach to prehistoric economics and symbolism". *Geoarchaeology* 12 (2): 137-163. https://doi.org/10.1002/(SICI)1520-6548(199703)12:2<137::AID-GEA3>3.0.CO;2-5

Lillios, K. 2008: *Heraldry for the dead. Memory, identity and the engraved stone plaques of Late Prehistoric Iberia*. University of Texas Press. Austin.

Lozano Rodríguez, J. A.; Carrión Méndez, F.; Morgado Rodríguez, A.; García González, D.; Afonso Marrero, J. A.; Martínez Fernández, G…. and Cámara Serrano, J. A. 2010: "Materias primas, productos líticos y circulación. Informe preliminar del estudio de los ajuares de la necrópolis de Los Millares (Santa Fe de Mondújar, Almería)". In S. Domínguez-Bella, J. Ramos Muñoz, J. M. Gutiérrez López and

M. Pérez Rodríguez (eds.): *Minerales y rocas en las sociedades de la Prehistoria*. Universidad de Cádiz. Cádiz: 285-296.

Lozano Rodríguez, J. A.; Puga Rodríguez, E.; García-Casco, A.; Martínez-Sevilla, F.; Contreras Cortés, F.; Carrasco Rus, J. and Martín-Algarra, A. 2018: "First evidence of prehistoric eclogite quarrying for polished tools in the Iberian Peninsula and their circulation". *Geoarchaeology* 33 (3): 364-385. https://doi.org/10.1002/gea.21646

Lozano Rodríguez, J. A.; Ruíz Puertas, G.; Hódar-Correa, M.; Pérez-Valera, F. and Morgado Rodríguez, A. 2014: "Prehistoric engineering and astronomy of the great Menga Dolmen (Málaga, Spain): A geometric and geoarchaeological analysis". *Journal of Archaeological Science* 41: 759-771. https://doi.org/10.1016/j.jas.2013.10.010

Martínez Fernández, G. 2016: "Poblamiento y sociedad durante la Prehistoria Reciente en la cuenca del Alto Almanzora". In G. Martínez Fernández, R. Pozo Marín, M. J. López Medina, and C. M. Acosta Pozo (eds.): *Actas de las VI Jornadas de Historia Local "Arqueología y Patrimonio" (Tíjola 2012)*: 15-140. Tíjola.

Morgado Rodríguez, A.; Lozano Rodríguez, J. A.; García Sanjuán, L.; Odriozola Lloret, C. and Luciañez Triviño, M. 2016: "The allure of rock crystal in southern Iberian Copper Age: Technical mastery and distinguished objects at Valencina de la Concepción (Seville, Spain)". *Quaternary International* 424: 232-249. https://doi.org/10.1016/j.quaint.2015.08.004

Murillo-Barroso, M.; Martinón-Torres, M.; García Sanjuán, L.; Wheatley, D. W.; Hunt Ortiz, M.; Forteza González, M. and Hernández Arnedo, M. J. 2015: "New objects in old structures. The Iron Age hoard of the Palacio III megalithic funerary complex (Almadén de la Plata, Seville, Spain)". *Journal of Archaeological Science* 57: 322-334. https://doi.org/10.1016/j.jas.2015.03.013

Murrieta Flores, P.; García Sanjuán, L. and Wheatley, D. W. 2014: "Modelando la movilidad y el movimiento a través de los SIG. Estudios de Caso en la Prehistoria Reciente de Sierra Morena". In E. García Alfonso (ed.): *Actas del II Congreso de Prehistoria de Andalucía (Antequera 2012). Movilidad, contacto y cambio*: 77-98. Sevilla.

Murrieta Flores, P. A.; Wheatley, D. W. and García Sanjuán, L. 2011: "Movilidad y vías de paso en los paisajes prehistóricos: megalitos y vías pecuarias en Almadén de la Plata (Sevilla, España)". In V. Mayoral Herrera and S. Celestino Pérez (eds.): *Tecnologías de Información Geográfica y Análisis Arqueológico del Territorio. Actas del V Simposio Internacional Arqueología de Mérida (Mérida 2007)*. Anejos de Archivo Español de Arqueología 59, CSIC. Mérida: 412-423.

Odriozola Lloret, C. Dias, M. I.; García Sanjuán, L. and Wheatley, D. 2009: "A preliminary approach from material science to Copper Age funerary pottery in southern Iberia: The Palacio III (Sevilla, Spain) tholos tomb". In K. T. Biró, V. Szilágyi and A. Kreiter (eds.): *Vessels inside and outside: EMAC'07. 9th European Meeting on Ancient Ceramics (Budapest 2007)*: 111-118. Budapest.

Owoc, M. A. 2002: "Munselling the mound: the use of soil colour as metaphor in British Bronze Age funerary ritual". In A. Jones and G. Macgregor (eds.): *Colouring the past. The significance of colour in archaeological research*. Berg. Oxford: 127-140.

Polvorinos del Río, A.; García Sanjuán, L.; Hernández Arnedo, M. J. and Almarza López, J. 2002a: "Análisis arqueométrico de posibles objetos cultuales prehistóricos de Almadén de la Plata (Sevilla)". In C. Roldán (ed.): *Actas del IV Congreso Nacional de Arqueometría (Valencia 2001)*: 321-327. Valencia.

Polvorinos del Río, A.; Hurtado Pérez, V.; Hernández Arnedo, M. J. and Almarza López, J. 2002b: "Caracterización mineralógica del ajuar del enterramiento calcolítico (Tumba 3) de La Pijotilla (Badajoz)". In C. Roldán (ed.): *Actas del IV Congreso Nacional de Arqueometría (Valencia 2001)*: 315-320. Valencia.

Read, C.; Grapes, R. and Lillios, K. 1997: *Petrography and chemical analyses of prehistoric amphibolite artefacts from Portugal and possible source rock from Western Iberia*. Victoria University at Wellington. Wellington.

Rogerio-Candelera, M. A.; Karen Herrera, L.; Miller, A. Z.; García Sanjuán, L.; Mora Molina, C.; Wheatley, D. W.... and Saiz-Jimenez, C. 2013: "Allochthonous red pigments used in burial practices at the Copper Age site of Valencina de la Concepción (Sevilla, Spain): characterisation and social dimension". *Journal of Archaeological Science* 40 (1): 279-290. https://doi.org/10.1016/j.jas.2012.08.004

Rojo Guerra, M. A.; García Martínez De Lagrán, I.; Garrido Pena, R.; Morán Dauchez, G. and Kunst, M. 2005: "El color como instrumento simbólico en el megalitismo del Valle de Ambrona (Soria)". In P. Arias Cabal, R. Ontañón Peredo and C. García-Moncó Piñeiro (eds.): *Actas del III Congreso de Neolítico en la Península Ibérica (Santander 2003)*: 681-690. Santander.

Rojo Guerra, M.; Garrido-Pena, R.; García-Martínez de Lagrán, I. and Tejedor-Rodríguez, C. 2013: "Lithology and colour in the symbolic landscape of megalithic tombs in the Ambrona Valley (Soria, Spain)". In J. N. Huyodo and E. Mens (eds.): *Les premiers architectures en pierre en Europe Occidentale. Du Vème au IIème millénaire avant J.-C.* Press Universitaire de Rennes. Rennes: 211-219.

Rubio De Miguel, I. 1989: "El Neolítico peninsular. Una interpretación de los datos arqueológicos", Cuadernos de Prehistoria y Arqueología de la Universidad Autónoma de Madrid 16: 11-41.

Scarre, C. 2002: "Colour and materiality in prehistoric society". In A. Jones and G. Macgregor (eds.): *Colouring the past. The significance of colour in archaeological research*. Berg. Oxford: 227-240.

Veiga, F. 2009: "El fósil no quiere que lo muevan". *El Correoweb* 16 de septiembre.